

TYPE MATERIAL OF BIVALVE MOLLUSKS COLLECTED DURING
VÉNUS VOYAGE (1836–1839) FROM KAMCHATKA, RUSSIA,
IN THE MUSÉUM NATIONAL D'HISTOIRE NATURELLE, PARIS

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ABSTRACT

Syntypes of four species of bivalve molluscs – *Nucula laternaria* Valenciennes, 1846; *Nucula amygdalea* Valenciennes, 1846; and *Nucula oeolica* Valenciennes, 1846, all Yoldiidae; and *Cardium californiense* Deshayes, 1839, Cardiidae – collected from Kamchatka during the historic voyage of the *Vénus* (1836–1839), are illustrated and their taxonomic status and distribution are discussed.

Key words: Bivalvia, syntypes, Yoldiidae, Cardiidae, Kamchatka.

INTRODUCTION

The frigate *Vénus* was sent to the Pacific Ocean by the French government in 1836 to compile maps of bays and islands and to do geophysical and astronomical studies, to collect natural history objects, and to report on the whale fisheries in the Pacific for the benefit of the French industry (Buck, 1953; Chamberlin, 1960). The voyage commenced on December 29, 1836, from Brest, lasted for 30 months, and the ship sailed around the world. Captain Abel Du Petit-Thouars and his first officer, Chiron, collected almost 400 species and over 1,500 specimens of mollusks eventually deposited in the Muséum National d'Histoire Naturelle, Paris (Chamberlin, 1960; hereafter, MNHN). The famous French zoologist Achille Valenciennes** published 27 plates with illustrations of about 86 species of molluscs collected on the voyage. The images were accompanied by Latin names in the captions (at least 62 new names – Chamberlin, 1960), but the text never appeared (Dance, 1966). Most of the molluscs figured represented shallow-water species from the Indo-Pacific and the west coast of the Americas, but some were from the northwest Pacific; type material is identified in the collections of the MNHN (Lamy, 1922). From August 30 to September 15, 1837, the *Vénus* visited Avacha [Awatscha] Bay [Avachinsky Zaliv] in Kamchatka, now part

of Russia, and then sailed for California. We identified type material of four species described from Kamchatka by Valenciennes and Deshayes (Deshayes, 1839; Valenciennes, 1846) in the collection of the MNHN; two of them appear to be long forgotten in the 20th century, one with unresolved taxonomic problems, and one was never figured. Deshayes (1839) described two additional species from Kamchatka – *Anomia macrochisma* Deshayes, 1839 and *Modiola cultellus* Deshayes, 1839 – but the type material was not found at the MNHN.

It is of interest that Valenciennes published two additional, frequently overlooked papers on molluscs of the northern Sea of Japan, collected by surgeon Barthe of the frigate *La Sybille* (Valenciennes, 1858a, b). These included descriptions of the bivalves *Pecten dominicanus* Valenciennes, 1858 (possible synonym of *Mizuhopecten yessoensis* (Jay, 1856); type material not found), *Mytilus unguiculatus* Valenciennes, 1858 (senior synonym of *Mytilus coruscus* Gould, 1861), and *Mactra sybillae* Valenciennes, 1858 (senior synonym of the well-known *Spisula sachalinensis* (Schrenck, 1862)). These were not illustrated, and only discovery of the type material (Habe, 1978; Kantor & Sysoev, 2002) allowed recognition of *M. sybillae* (suppressed: Kafanov, 1983; Melville, 1985) and to qualify *M. coruscus* as a *nomen protectum* (Lutaenko, 2005b).

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**A. Valenciennes (1794–1865) was a French zoologist who made significant contribution to ichthyology; he worked with Georges Cuvier on the famous *Histoire naturelle des poissons* (1828–1848). See his biography: Monod et al. (1967), Bauchot et al. (1990).

Abbreviations

The following abbreviations are used in the paper: BMNH – The Natural History Museum, London; ICZN – International Code of Zoological Nomenclature; MNHN – Muséum National d'Histoire Naturelle, Paris; USNM – National Museum of Natural History; Smithsonian Institution; Washington, D.C.

LIST OF SYNTYPES

Family Yoldiidae Dall, 1908

Nucula laternaria Valenciennes, 1846
(Figs. 1C, 3A, B)

Present status: junior synonym of *Megayoldia thraciaeformis* (Storer, 1838). Original description/illustration: Valenciennes, 1846: pl. 23, fig. 5.

Type locality: Kamchatka. Type material: 1 syntype (complete shell), MNHN 21937, length 40.8 mm, height 25.7 mm.

Comments

The type specimen is represented by two valves glued to a piece of cardboard found in the general collection in 2004. The original la-

bel glued to the opposite side of the cardboard mount states (Fig. 2A): “Soft part in alcohol under the letter A, gift from M. Neboux Voyage de la Vénus” (Adolphe Simon Neboux, 1806–1844, was a doctor and naturalist on board the *Vénus*). The original figure (Valenciennes, 1846: pl. 23, fig. 5; Fig. 1C herein) corresponds well with the type specimen. According to Coan et al. (2000) and Warén (1989), *M. thraciaeformis* has at least eight synonyms – *Nucula navicularis* Couthouy, 1839; *Yoldia angilaris* Möller, 1842; *Yoldia regularis* Verrill, 1884; *Portlandia dalli* Krause, 1885; *Nucula groenlandica* Posselt, 1898; *Yoldia secunda* Dall, 1916; *Yoldia scapha* Yokoyama,

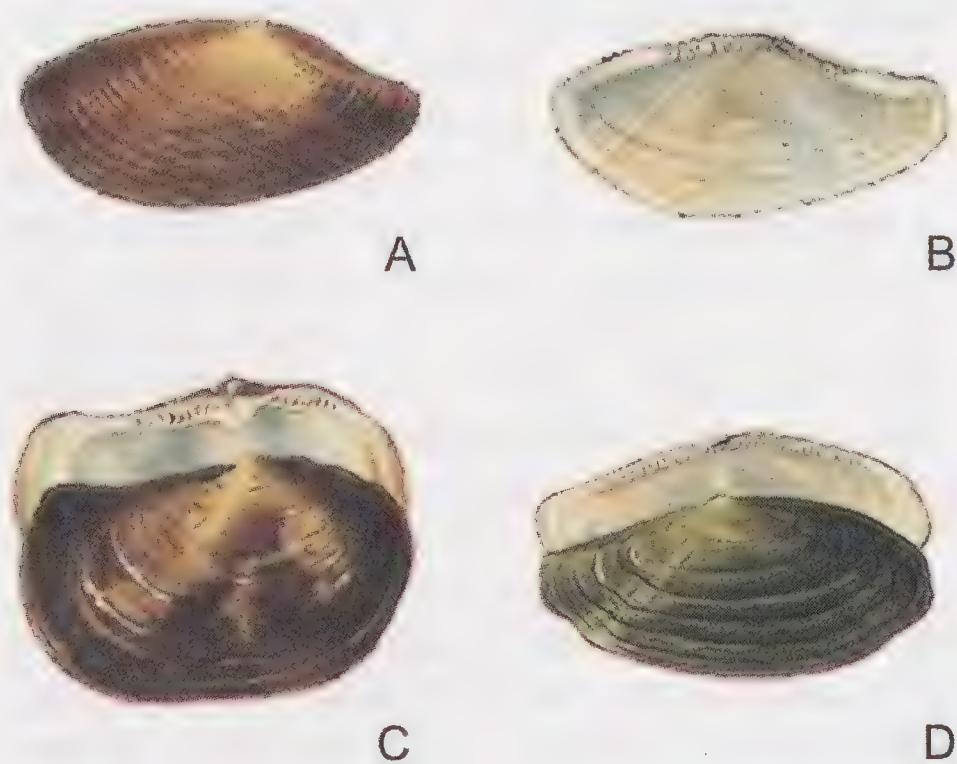
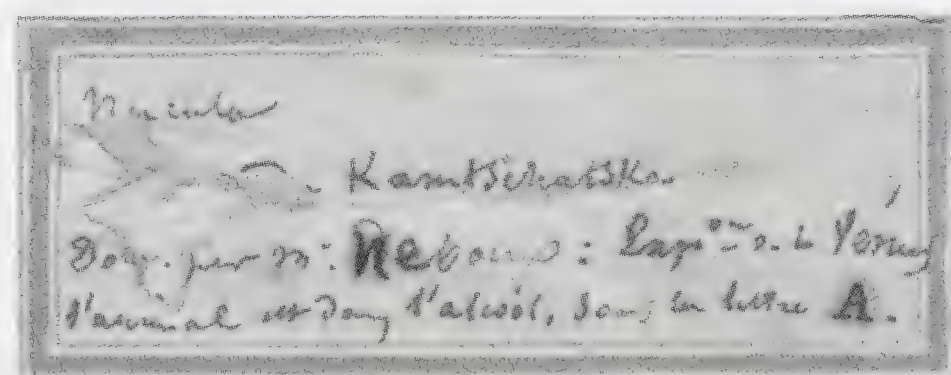
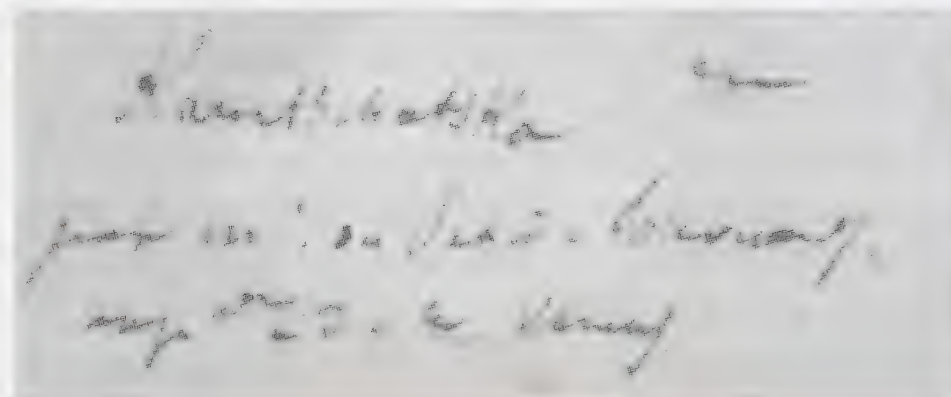
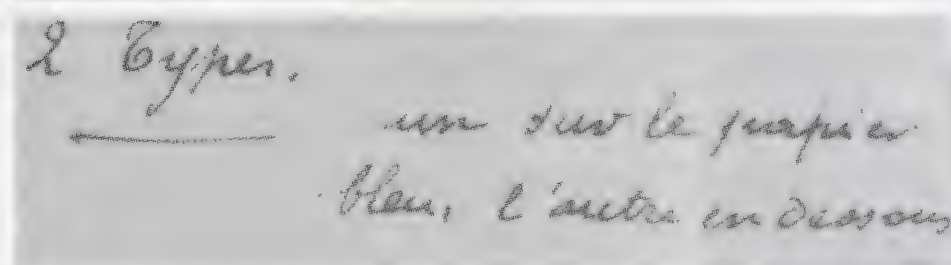
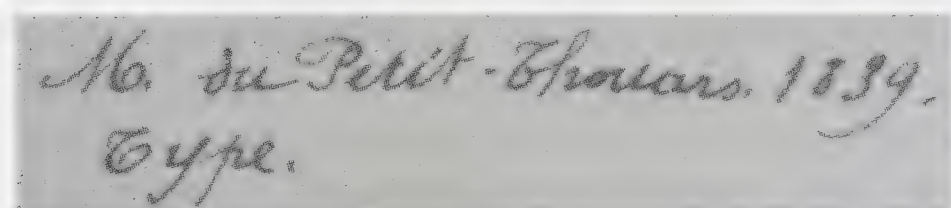


FIG. 1. Original illustrations of the bivalve species described from Kamchatka and collected by *Vénus* voyage in 1837. A, B: *Nucula aeolica* Valenciennes, 1846 (Valenciennes, 1846, pl. 23, fig. 3); C: *Nucula laternaria* Valenciennes, 1846 (Valenciennes, 1846, pl. 23, fig. 5); D: *Nucula amygdalea* Valenciennes, 1846 (Valenciennes, 1846, pl. 23, fig. 6).



A



B



C

FIG. 2. Original museum labels for the type lots of the three species in the NMHN. A: *Nucula laternaria* Valenciennes, 1846; B: *Nucula amygdalea* Valenciennes, 1846; C: *Cardium californiense* Deshayes, 1839.



A



B



C



D



E



F

FIG. 3A, B. *Nucula laternaria* Valenciennes, 1846 (= *Megayoldia thraciaeformis* (Storer, 1838)). Syntype, right (A) and left (B) valves of complete shell, MNHN 21937, length 40.8 mm, Loc. Kamchatka; C–F: *Cardium californiense* Deshayes, 1839 (= *Clinocardium* (*Keenocardium*) *californiense* (Deshayes, 1839)). Syntype MNHN 3970, left (C, D) and right (E, F) outside and inside, length 62.5 mm, Loc. Kamchatka. [Since this photo was taken in 2004, the left valve (C, D) was broken].

1926; *Microyoldia ochotensis* Scarlato, 1981) – but *N. laternaria* was not considered by these authors. However, in the 19th century, Hanley (1860: 167) listed *Y. laternaria* as a synonym of *Leda thraciaeformis* (in the sect. II – subgenus *Yoldia*), which was followed by G.B. Sowerby II (1871). It is very likely that *Microyoldia ochotensis* Scarlato, 1981, described from a single specimen from 43 m in the southern Sea of Okhotsk, is a young specimen of a North Pacific species of *Megayoldia*. *Megayoldia ochotensis* lacks a ligament pit characteristic of young specimens of *M. thraciaeformis* (Warén, 1989). *Megayoldia kamtchatkana* Scarlato, 1981, described from off Avacha Bay, southeastern Kamchatka, and living at 1,500–2,000 m, is a synonym of *Megayoldia montereyensis* (Dall, 1893) (Coan et al., 2000). *Megayoldia martyria* (Dall, 1897) and *Megayoldia lischkei* (E. A. Smith, 1895) from the North Pacific both differ from *M. thraciaeformis* in the shell shape: elongate-subquadrate, with posterior end longer and bluntly pointed in the former species, and more produced, but not clearly truncate posterior end in the latter species. Amano (1996) regarded *M. lischkei* as belonging to the genus *Portlandia* Mörch, 1857.

Megayoldia thraciaeformis is widely distributed in the low Arctic Ocean and circumboreally, south to off San Francisco Bay, California, along the American coast of the Pacific Ocean (Coan et al., 2000), and to Japan (Higo et al., 1999) and Korea (Kwon et al., 2001; Min et al., 2004). In Russian waters, it is known in the Sea of Japan south to Possjet Bay, the Sea of Okhotsk, southeastern Kamchatka, and the Bering Sea (Scarlato, 1981). The known depth range is 20–545 m in Russian part of the Pacific Ocean (Scarlato, 1981), and 25–760 m for the entire Pacific (Coan et al., 2000). In the Atlantic Ocean, it is distributed as far south as southern Greenland and Massachusetts Bay (Warén, 1989).

Nucula amygdalea Valenciennes, 1846
(Figs. 1D, 4D)

Present status: junior synonym of *Yoldia* (*Yoldia*) *hyperborea* (Gould, 1841). Original description/illustration: Valenciennes, 1846: pl. 23, fig. 6.

Type locality: Kamchatka. Type material: 2 syntypes (complete shells; two valves are damaged), MNHN 21938, 1st specimen: length 47.6 mm, height 22.0 mm; 2nd specimen: length 38.5 mm, height 17.8 mm.

Comments

Subgenus *Yoldia* (*Yoldia*) Möller, 1842, is characterized by the absence of sculpture, or a few commarginal lirae, whereas two other North Pacific subgenera – *Yoldia* (*Cnesterium*) Dall, 1838, and *Yoldia* (*Kalayoldia*) Grant & Gale, 1931, have either oblique striae or sharp commarginal ribs. Based on this feature, the syntypes of *N. amygdalea* undoubtedly belong in *Yoldia* (*Yoldia*), and differ from *Yoldia* (*Yoldia*) *myalis* (Couthouy, 1838), the allied species of the subgenus in the North Pacific. Coan et al. (2000) suggested that *Yoldia bartschi* Scarlato, 1981 (= *Yoldia tartarica* Bartsch in Ushakov, 1953, *nom. nud.* – see Ushakov, 1953, p. 261) is a synonym of *Y. hyperborea*.

There has been continuing discussion on the relationship between *Y. hyperborea* and *Y. amygdalea* (Cowan, 1968; Bernard, 1979; Scarlato, 1981), but it seems that *Y. hyperborea* is a pan-Arctic, amphi-Pacific and North Atlantic (south to Norway, Iceland and Greenland) species (Coan et al., 2000).

Nucula oeolica Valenciennes, 1846
(Figs. 1A, B, 4A–C)

Present status: unclear; see below. Original description/illustration: Valenciennes, 1846: pl. 23, fig. 3.

Type locality: Kamchatka. Type material: 1 syntype (damaged shell), MNHN 21939, size of the most complete right valve: length 30.8 mm, height 17.1 mm.

Comments

This species was forgotten in the 20th century. However, *N. oeolica* was cited by Hanley (1860), G. B. Sowerby II (1871), Schrenck (1867), and Paetel (1890) as a synonym of *Yoldia lanceolata* (J. Sowerby, 1817), a Pliocene-Pleistocene European species.

Nucula oeolica undoubtedly belongs to the subgenus *Yoldia* (*Cnesterium*) Dall, 1898, which is taxonomy complicated. There are at least ten available names regarded as synonyms of the boreal-arctic *Yoldia* (*Cnesterium*) *seminuda* Dall, 1871, complex, and among them six names refer to Recent species (Coan et al., 2000): *Y. seminuda*, *Y. scissurata* Dall, 1897 (*nom. nov.* pro *Nucula arctica* Broderip & G. B. Sowerby I, 1829, *non* Gray, 1824); *Yoldia ensifera* Dall, 1897; *Yoldia keppeliana* G. B. Sowerby III, 1904; *Yoldia ensifera plena*

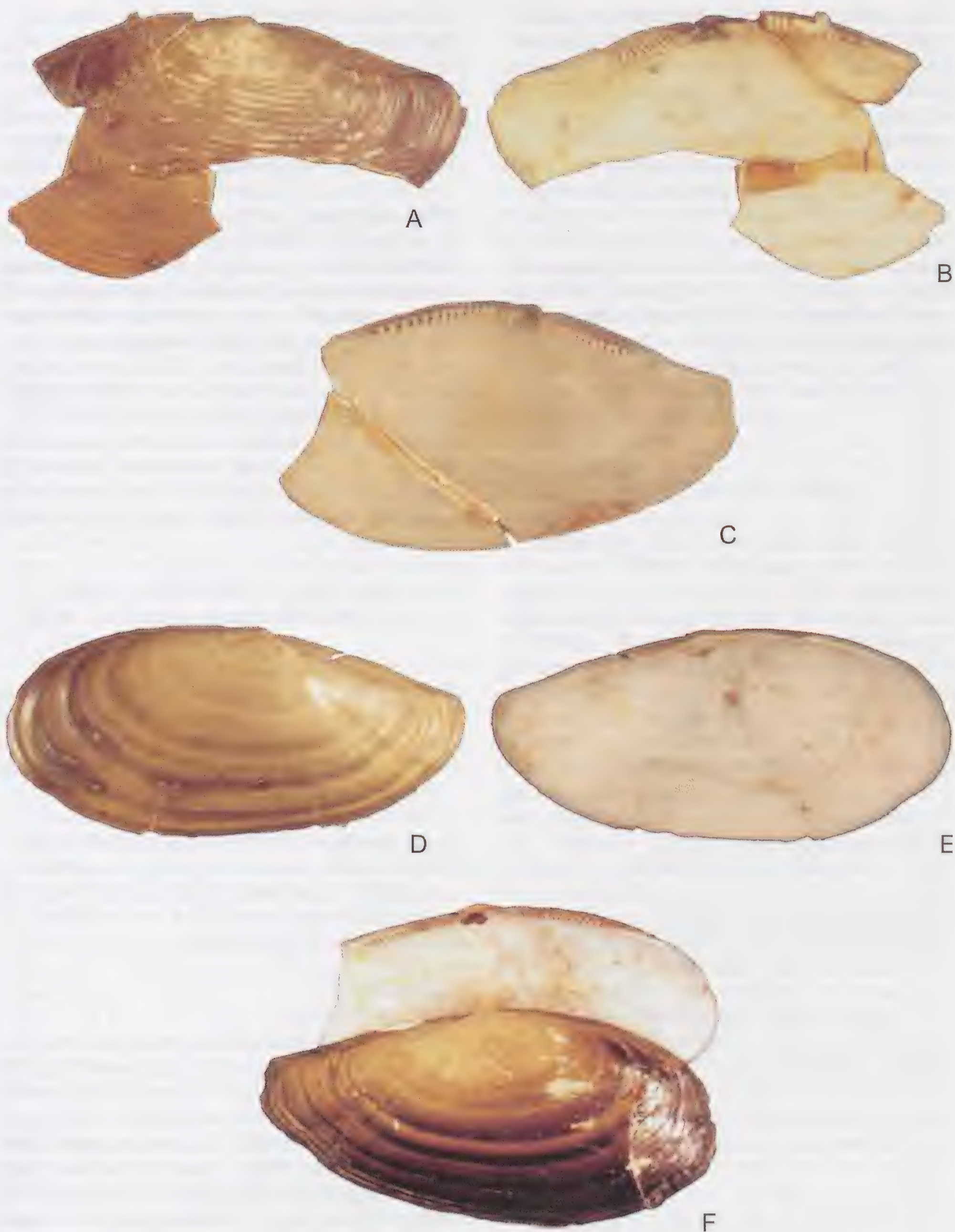


FIG. 4. *Nucula* sp. A–C: *Nucula aeolica* Valenciennes, 1846 (= *Yoldia oeolica* (Valenciennes, 1846)); A, B: Syntype MNHN 21939 left valve inside and outside; C: Syntype MNHN 21939 right valve outside, length 30.8 mm, Loc. Kamchatka; D, E: *Nucula amygdalea* Valenciennes, 1846 (= *Yoldia* (*Yoldia*) *hyperborea* (Gould, 1841)); D: Syntype MNHN 21938 left valve outside; E: Syntype MNHN 21938 right valve inside, length 38.5 mm, Loc. Kamchatka; F: *Nucula amygdalea* Valenciennes, 1846 (= *Yoldia* (*Yoldia*) *hyperborea* (Gould, 1841)), Syntype MNHN 21938, left valve outside and right valve inside, length 47.6 mm, Loc. Kamchatka.

Dall, 1908; and *Yoldia* (*Cnesterium*) *johanni* Dall, 1925. The relationships among these taxa are much in need of detailed study. Two other Recent species from the northwestern Pacific – *Yoldia* (*Cnesterium*) *toporoki* Scarlato, 1981, distributed in the southern Sea of Okhotsk and northern Sea of Japan (Scarlato, 1981; Lutaenko, 2002, 2005a), and *Yoldia* (*Cnesterium*) *notabilis* Yokoyama, 1922 (with a synonym *Yoldia excavata* Dall, 1925), distributed off Japan, Korea and northern China (Higo et al., 1999; Min et al., 2004; Xu & Zhang, 2008), are distinct representatives of the subgenus in that part of the Pacific Ocean.

Based on the examination of type specimens and illustrations of types of *Y. keppeliana* (2 syntypes, BMNH 1904.12.23.154 and 1904.12.23.155, 1 syntype MNHN 23246), *N. arctica* (1 figured syntype BMNH 1858.5.12.241), *Y. excavata* (syntypes USNM 249337; figured by Matsukuma et al., 1991: fig. 4A, B, and Higo et al., 2001: fig. B30s), *Y. johanni* (syntypes USNM 107694, figured by Matsukuma et al., 1991: fig. 4C, D, and Higo et al., 2001: fig. B31), *Y. notabilis* (lectotype figured by Oyama, 1980: pl. 21, fig. 5), *Y. seminuda* (holotype USNM 197678, figured by Moore, 1983: pl. 4, fig. 19) and *Yoldia* (*Cnesterium*) *pseudonotabile* Scarlato, 1981 (holotype figured by Scarlato, 1981: photo 132), we can preliminarily assume that: (1) *Y. keppeliana* and *Y. johanni* are distinct from each other and are not identical to *Y. seminuda*; (2) *Y. keppeliana pseudonotabile* is a synonym of *Y. johanni*, and not of *Y. keppeliana* or *Y. notabilis*, as stated by Kafanov (1991); (3) *Y. notabilis* does not inhabit the Russian part of the Sea of Japan, and previous records (Lutaenko, 1999, 2002, 2005) are erroneous and may refer to *Y. seminuda*; (4) *Y. excavata* is a synonym of *Y. notabilis*, but not of *Y. seminuda* as stated by Scarlato (1981) and Kafanov (1991); and (5) *Y. oeolica* is the earliest available name for *Y. seminuda*.

It is of interest that *N. arctica* was described from “Oceano Arctico” but with indication that “two or three specimens were obtained in Vatcha Bay, Kamtschatka” (Broderip & Sowerby I, 1829), that is, Avacha Bay [Avachinsky Zaliv], because the bay was visited by the Blossom expedition in 1825–1828 under the command of Captain Beechey (Rosewater, 1968). Comparison of the original illustrations of Broderip & Sowerby I (1829: pl. 9, fig. 1), Valenciennes (1846: pl. 23, fig. 3) and type specimens clearly proves the conspecificity of *N. arctica* (= *Y. scissurata*) and *N. oeolica*.

Considering that *Y. oeolica* is a valid name that has priority over *Y. seminuda*, one may wish to apply the reversal of precedence in accordance with ICZN Code Article 23.9.1, which states that prevailing usage of *Y. seminuda* must be maintained when the senior synonym has not been used as a valid name after 1899 and the junior synonym has been used for a particular taxon, as its presumed valid name, in at least 25 works, published by at least 10 authors in the immediately preceding 50 years and encompassing a span of not less than 10 years. However, some Japanese and Russian authors regard two other allied species, *Y. johanni* and *Y. keppeliana*, as separate distinct species, whereas Coan et al. (2000) thought that they might be synonyms of *Y. seminuda*. In any case, *Y. oeolica* has priority over these species as well. Until a detailed revision of *Yoldia* (*Cnesterium*) is undertaken, we prefer not to take any action with regard to this name at present.

Family Cardiidae Lamarck, 1809
Cardium californiense Deshayes, 1839
(Fig. 1C–F)

Present status: *Clinocardium* (*Keenocardium*) *californiense* (Deshayes, 1839) (Coan et al., 2000) or *Keenocardium californiense* (Deshayes, 1839) (Kafanov, 1999). Original description: Deshayes, 1839: 360.

Type locality: “Côtes de Californie” (error = Kamchatka; see below). Type material: 2 syntypes (complete shells), MNHN 3970 (figured here), length 62.5 mm, height 54.7 mm, width 34.3 mm; MNHN 3971.

Comments

Kafanov (1999) mentioned two specimens as “syntypes” in the collection of the MNHN with reference to letters of E. Fischer-Piette and A. M. Keen. Earlier, he mentioned a “lectotype” in the MNHN without illustration and label data (Kafanov, 1980). However, the specimen figured by him (Kafanov, 1999: pl. 2, figs. 3–6) as lectotype does not correspond with specimens stored in that museum’s type collection, although the size he gave – 62 x 54 mm – is same as of one of the specimens (MNHN 3970). It is obvious that there was confusion with the photographs and that the specimen figured by Kafanov (1999) does not belong to the type series. According to ICZN Article

74.2, if it is demonstrated that a specimen designated as a lectotype was not a syntype, it loses its lectotype status. Accordingly, we prefer to regard both MNHN specimens 3970 and 3971 as syntypes. There is no doubt that these specimens were collected by *Vénus* as the original printed label of the 19th century is present (Fig. 2C).

In the original description, Deshayes (1839) indicated the coast of California as the collecting site for this species. Kafanov (1980) restricted the type locality to Kamchatka; this species does not inhabit California and is unknown south of Ketchikan, Alaska (55.3°N) (Coan et al., 2000). Kafanov (1974) believing that *Cardium boreale* Broderip & G. B. Sowerby I, 1829, was an earlier name for this species, requested the International Commission on Zoological Nomenclature to suppress this name, but the Commission ruled that *C. boreale* is a *nomen dubium* (Melville, 1984). Coan et al. (2000) regarded *C. boreale* as a possible synonym of *Clinocardium* (*Ciliatocardium*) *ciliatum* (Fabricius, 1780), but Kafanov (1999) again placed the former species in the synonymy of *C. californiense* with a query.

Kafanov (1999) subdivided this species into three subspecies: *C. californiense californiense*, *C. californiense uchidai* Habe, 1955, and *C. californiense middendorffi* (Kafanov, 1999), based on the geographical variation in rib number and the valve convexity/length ratio.

It was long believed that *C. californiense* had a southern distribution limit in the northwest Pacific in the Sea of Japan side of Korea and Japan (Kafanov, 1999; Coan et al., 2000). However, there are several records of *C. californiense* from the Yellow Sea, on both the Chinese (Xu, 1964; 1997; Qi et al., 1989; Liu, 2008) and the Korean coasts (Yoo, 1976; Je et al., 1988; Kwon et al., 1993, 2001; Kwon & Lee, 1999). Xu (1964: 98) mentioned that *C. californiense* "... is found only in the deeper waters of the Yellow Sea occupied by the cold water mass ..." in a depth range of 23–77 m (Liu, 2008). We believe that part of these records refer, in fact, to *Clinocardium* (*Keenocardium*) *buelowi* (Rolle, 1896), which differs clearly from *C. californiense* in the lack of a keel twist on the posterior area of the valves and in having fewer ribs (37–38) (Kafanov, 1999). At least, illustrations in Qi et al. (1989: text fig. 141 – about 37 ribs), Yoo (1976: pl. 29: figs. 10, 11), Kwon and Lee (1999: text fig. on p. 75) might belong to *C. buelowi*. Coan et al. (2000) suggested that the relationship of *C. californiense uchidai* to *C. buelowi* has yet to be fully resolved.

Specimens collected from Yeongil Bay in Korean coast of the Sea of Japan differ from the southern subspecies *C. californiense uchidai* by the thin, interiorly colored shell with a lesser number (32–34) of sparsely spaced radial ribs, and the ratio of convexity/length is between 0.52 and 0.72 (0.59 on average) in measured specimens (Lutaenko et al., 2003). The number of ribs on specimens of *C. californiense* collected in the Okhotsk and Japan seas is between 34 and 56, but mostly about 43–51 (Lutaenko et al., 2003: fig. 4); this figure is close to that of Kafanov (1999: fig. 1) – 39–61, most often 43–53 ribs. This allows us to suggest that Korean population may belong to a distinct, as-yet unnamed species. Kafanov (2004) did not rule out this possibility.

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